

N91-28201

CURRENT SYSTEMS

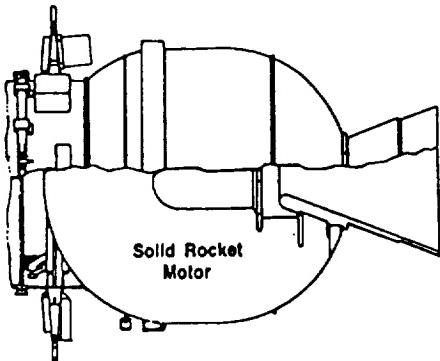
UPPER STAGES

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UNITED STATES ORBITAL TRANSFER VEHICLES

CHARACTERISTICS		PAM-D	PAM-DII	TOS	IUS
STAGE:	MANUFACTURER	MDAC	MMC	BAC	
	LENGTH DIAMETER	(FT) (FT)	6.5 5.3	10.0 11.3	16.4 9.5
ENGINE:	MANUFACTURER	THIOKOL (STAR 48) 1 SOLID	ISTP 1 SOLID	CSD SRM-1 1 SOLID	CSD SRM-1 SRM-2 HTPB
	TYPE NUMBER	TP-H-3340	-	HTPB	
	FUEL COMPOSITION				
TOTAL THRUST	(LB)	14,500	17,600	45,000	45,000
SPECIFIC IMPULSE	(SEC)	205.6	-	294	18,250
BURN TIME	(SEC)	85.0	121	150	300.9
STAGE:	PAD WEIGHT	(LB)	4,616	7,690	21,400
	IMPULSE PROPELLANT WEIGHT	(LB)	4,400	7,150	2,390
	BURNOUT WEIGHT	(LB)	418	540	3,200
	AIRBORNE SUPPORT EQUIP. WT	(LB)	2,505	3,525	2,553
PAYOUT:	TO GEO ONE-WAY STAGE	(LB)	1,400	2,100	6,600
	TO GEO TRANSFER ORBIT (GTO)	(LB)	2,750	4,160	13,000
	ILLUSTRATION:				
SCHEDULE:	START DATE	1976	1980	1983	1978
	OPERATIONAL DATE	1982	1985	1986	1982
TYPE OF DEVELOPMENT	COMMERCIAL	COMMERCIAL	COMMERCIAL	U.S. GOVT	U.S.A.F
SPONSOR	MDAC	MDAC	OSC	USAF	

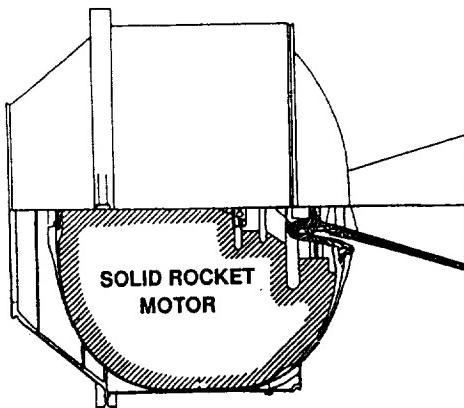
PAM-D



- COMPATIBILITY: DELTA II AND SPACE SHUTTLE
- PERFORMANCE CAPABILITY: 2,700 POUNDS GEOSYNCH TRANSFER
- FLIGHT RECORD: 95% (40 / 42)
- COST: \$6 to 7 MILLION DOLLARS

* 160 x 19,323 Nmi (296 x 35,786 Km)

PAM-DII



- COMPATIBILITY: TITAN III AND SPACE SHUTTLE
- PERFORMANCE CAPABILITY: 4,000 POUNDS GEOSYNCH TRANSFER*
- FLIGHT RECORD: 100% (2 / 2)
- COST: \$10 to 12 MILLION DOLLARS

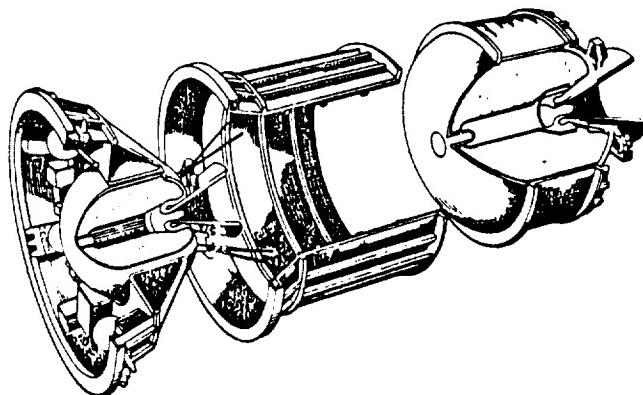
* 160 x 19,323 Nmi (296 x 35,786 Km)

TOS



- COMPATIBILITY: TITAN III AND SPACE SHUTTLE
- PERFORMANCE CAPABILITY: 5,000 to 13,400 POUNDS GEOSYNCH TRANSFER
- FLIGHT RECORD:
- COST: \$35 to 45 MILLION DOLLARS

IUS



- COMPATIBILITY: TITAN IV AND SPACE SHUTTLE
- PERFORMANCE CAPABILITY: 5,000 POUNDS IN GEOSYNCH
- FLIGHT RECORD: 86% (6 / 7)
- COST: \$60 to 70 MILLION DOLLARS

POTENTIAL NASA UPPER STAGE MISSIONS

- LUNAR OBSERVER - 1996
- MARS OBSERVER FOLLOW-ON - 1996
- ADVANCED TDRS (SERIES OF 9) - 1997

U.S. ORBITAL TRANSFER VEHICLES COST EFFECTIVENESS

